

TABLE 8—FUSE RATINGS OR INSTANTANEOUS SETTING OF CIRCUIT BREAKERS FOR SHORT-CIRCUIT PROTECTION OF PORTABLE CABLES AND CORDS—Continued

Conductor size—AWG or MCM	Ohms/1,000 ft. at 25 °C.	Maximum allowable fuse rating (amperes)	Maximum allowable circuit breaker instantaneous setting (amperes) <sup>1</sup>
350 .....	.031	.....	2,500
400 .....	.027	.....	2,500
450 .....	.024	.....	2,500
500 .....	.022	.....	2,500

<sup>1</sup> Higher circuit-breaker settings may be permitted for special applications when justified.

TABLE 9—SPECIFICATIONS FOR PORTABLE CABLES LONGER THAN 500 FEET <sup>1</sup>

Conductor size—AWG or MCM	Max. allowable length (feet)	Normal ampacity at 60 °C. copper temperature (40 °C. ambient)	Resistance at 60 °C. copper temperature (ohms)
6 .....	550	50	0.512
4 .....	600	70	.353
3 .....	650	80	.302
2 .....	700	95	.258
1 .....	750	110	.220
1/0 .....	800	130	.185
2/0 .....	850	150	.157
3/0 .....	900	175	.130
4/0 .....	1,000	200	.116
250 .....	1,000	220	.098
300 .....	1,000	240	.082
350 .....	1,000	260	.070
400 .....	1,000	280	.061
450 .....	1,000	300	.054
500 .....	1,000	320	.050

<sup>1</sup> Fuses shall not be used for short-circuit protection of these cables. Circuit breakers shall be used with the instantaneous trip settings not to exceed the values given in Table 8.

[33 FR 4660, Mar. 19, 1968; 33 FR 6345, Apr. 26, 1968, as amended at 42 FR 8373, Feb. 10, 1977]

TABLE 10—HIGH VOLTAGE TRAILING CABLE AMPACITIES AND OUTSIDE DIAMETERS

Power conductor	Ampacity *	Outside diameter ** (inches)		
		SHD—GC 2001 to 5000 volts	SHD—CGC 2001 to 5000 volts	SHD—PCG 2001 to 5000 volts
Size AWG or kcmil	Amperes per conductor			
6 .....	93	1.56	1.62	
4 .....	122	1.68	1.73	
3 .....	140	1.78	1.82	1.94
2 .....	159	1.87	1.91	2.03
1 .....	184	1.95	1.98	2.12
1/0 .....	211	2.08	2.10	2.26
2/0 .....	243	2.20	2.20	2.40
3/0 .....	279	2.36	2.36	2.58
4/0 .....	321	2.50	2.50	2.76
250 .....	355	2.69	2.69	
300 .....	398	2.81	2.81	
350 .....	435	2.95	2.95	
500 .....	536	3.31	3.31	

\* These ampacities are based on single isolated conductor in air, operated with open-circuited shield for a 90 °C conductor temperature and an ambient temperature of 40 °C.

\*\* Tolerances for the outside diameter are +8% / - 5%.

[75 FR 17549, Apr. 6, 2010, as amended at 75 FR 20918, Apr. 22, 2010]

## APPENDIX II TO SUBPART D OF PART 18

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4	Sample factory inspection form.
5	Typical plane joint.
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7	Typical threaded joint.
8	Typical threaded straight stuffing box and packing gland lead entrance with provision for hose conduit.
9	Typical slip-fit straight-type and angle-type stuffing box and packing gland lead entrance.
10	Typical slip-fit angle-type stuffing box and packing gland lead entrance and typical plug for spare lead entrance hole.

**Figure 1**  
**TYPICAL LAYOUT DRAWING OF A MACHINE**

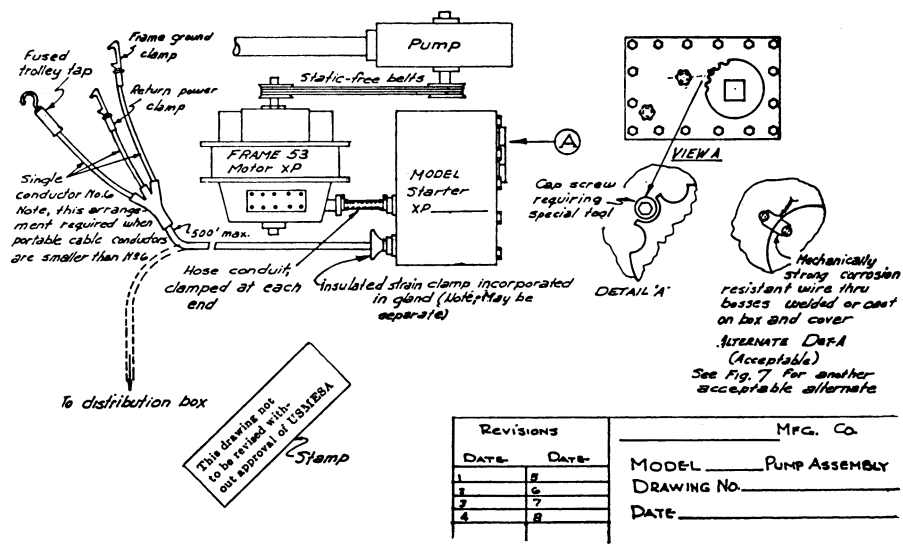


FIGURE 2—SAMPLE BILL OF MATERIAL

B. of M. No. \_\_\_\_\_  
Date \_\_\_\_\_

Revision \_\_\_\_\_  
Date \_\_\_\_\_  
1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_  
4. \_\_\_\_\_  
5. \_\_\_\_\_

Bill of Material (Electrical)

Model: \_\_\_\_\_ (Manufacturing Company)  
Approval 2G- \_\_\_\_\_ (Unit Name)  
Motor: \_\_\_\_\_  
Frame \_\_\_\_\_ (Manufacturing Company)  
Hp., \_\_\_\_\_ Volts, \_\_\_\_\_ Ph.,

Mine Safety and Health Admin., Labor

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\_\_\_\_\_ Cy., \_\_\_\_\_ R.P.M.  
X/P \_\_\_\_\_ (Date).  
\_\_\_\_\_ (Date) Extension.  
Starter: \_\_\_\_\_  
\_\_\_\_\_ (Manufacturing Company)  
Model \_\_\_\_\_  
\_\_\_\_\_ Hp., \_\_\_\_\_ Volts.  
X/P \_\_\_\_\_ (Date)  
\_\_\_\_\_ Extension.  
\_\_\_\_\_ (Date)  
Cable—Motor to Starter:  
Cond. No. \_\_\_\_\_"  
O.D., \_\_\_\_\_' Long  
Hose—Motor to Starter Cable:  
\_\_\_\_\_ " I.D., \_\_\_\_\_ " O.D., \_\_\_\_\_' Long  
Portable (Trailing) Cable—  
Type: \_\_\_\_\_  
Cond. No. \_\_\_\_\_"  
O.D., \_\_\_\_\_' Long  
Hose—for Portable Cable:  
\_\_\_\_\_ " I.D., \_\_\_\_\_ " O.D., \_\_\_\_\_' Long  
Hose Clamps—  
2 for Motor-Starter Hose conduit \_\_\_\_\_" D  
1 for Portable Cable Hose conduit \_\_\_\_\_" D\*  
\*Only when short length of hose is used. Trolley Tap—  
\_\_\_\_\_ (Manufacturing Company)  
Model \_\_\_\_\_ with \_\_\_\_\_-ampere fuse.  
Rail Clamps, 2.  
1 Ground Clamp, Cat. No. \_\_\_\_\_  
\_\_\_\_\_ (Manufacturing Company)  
1 Return Power Conductor, Cat. No. \_\_\_\_\_  
\_\_\_\_\_ (Manufacturing Company)  
or—as Optional  
Plug on outby end of potable cable for insertion into receptacle on distribution box or equivalent with short-circuit protective device set at \_\_\_\_\_ amperes.  
Static-free Belt  
Model \_\_\_\_\_  
Style \_\_\_\_\_  
Catalog No. \_\_\_\_\_,  
\_\_\_\_\_ (Manufacturing Company)  
Guard for Belt—  
Material \_\_\_\_\_  
Overall Dimensions \_\_\_\_\_" Long × \_\_\_\_\_"  
Wide × \_\_\_\_\_" High  
NOTE: The foregoing is intended as a guide. Additional electrical components used shall be completely identified.

FIGURE 3—MATERIAL TO BE INCLUDED WITH THE OPERATING INSTRUCTIONS—ON OR WITH THE WIRING DIAGRAM SUBMITTED TO EACH CUSTOMER

(SOMETIMES REFERRED TO AS "CAUTION STATEMENT")

CAUTION

To retain "permissibility" of this equipment the following conditions shall be satisfied:  
1. *General safety.* Frequent inspection shall be made. All electrical parts, including the portable cable and wiring, shall be kept in a safe condition. There shall be no openings into the casings of the electrical parts. A permissible distribution box shall be used for connection to the power circuit unless connection is made in fresh intake air. To maintain the overload protection on direct-current machines, the ungrounded conductor of the portable cable shall be connected to the proper terminal. The machine frame shall be effectively grounded. The power wires shall not be used for grounding except in conjunction with diode(s) or equivalent. The operating voltage should match the voltage rating of the motor(s).

2. *Servicing.* Explosion-proof enclosures shall be restored to the state of original safety with respect to all flame arresting paths, lead entrances, etc., following disassembly for repair or rebuilding, whether by the owner or an independent shop.

3. *Fastenings.* All bolts, nuts, screws, and other means of fastening, and also threaded covers, shall be in place, properly tightened and secured.

4. *Renewals and repairs.* Inspections, repairs, or renewals of electrical parts shall not be made unless the portable cable is disconnected from the circuit furnishing power, and the cable shall not be connected again until all parts are properly reassembled. Special care shall be taken in making renewals or repairs. Leave no parts off. Use replacement parts exactly like those furnished by the manufacturer. When any lead entrance is disturbed, the original leads or exact duplicates thereof shall be used and stuffing boxes shall be repacked in the approved manner.

5. *Cable requirements.* A flame-resistant portable cable bearing a MSHA assigned identification number, adequately protected by an automatic circuit-interrupting device shall be used. Special care shall be taken in handling the cable to guard against mechanical injury and wear. Splices in portable cables shall be made in a workmanlike manner, mechanically strong, and well insulated. Not more than five temporary splices are permitted in a portable cable regardless of length. Connections and wiring to the outby end of the cable shall be in accordance with recognized standards of safety.

FIGURE 4—SAMPLE FACTORY INSPECTION FORM

Date \_\_\_\_\_

Inspector \_\_\_\_\_

MACHINE

Designation: \_\_\_\_\_

Type: \_\_\_\_\_ Serial No. \_\_\_\_\_

MOTOR

Manufacturer: \_\_\_\_\_

Serial No.: \_\_\_\_\_ Type: \_\_\_\_\_

Frame: \_\_\_\_\_

Hp. \_\_\_\_\_ F.L. Speed: \_\_\_\_\_ Volts: \_\_\_\_\_ Amps.

Winding: \_\_\_\_\_ X/P No. \_\_\_\_\_ (or parts list designation).

STARTER

Manufacturer: \_\_\_\_\_

Serial No. \_\_\_\_\_ Type: \_\_\_\_\_

Hp. \_\_\_\_\_ Volts: \_\_\_\_\_ X/P No. \_\_\_\_\_ (or parts list designation).

Short-circuit protection \_\_\_\_\_ amps.

Overload-current protection \_\_\_\_\_ amps.

PORTABLE CABLE

Manufacturer: \_\_\_\_\_

Type: \_\_\_\_\_ Conductors: \_\_\_\_\_

Length: \_\_\_\_\_ O.D. \_\_\_\_\_ MSHA No. \_\_\_\_\_

Is all wiring around machine adequately protected from mechanical damage?

By hose conduit \_\_\_\_\_, Troughs \_\_\_\_\_

Metal tubing \_\_\_\_\_, Other \_\_\_\_\_

By removal of all sharp corners or edges? \_\_\_\_\_

Is wiring separated from hydraulic components? \_\_\_\_\_

Is an adequate insulated strain clamp provided for the portable cable? \_\_\_\_\_

Are all packing glands properly packed so that 1/8-inch clearance remains between packing nut and stuffing box? \_\_\_\_\_

Are lockwashers (or equivalent) provided for all explosion-proof enclosure fastenings? \_\_\_\_\_

Are all plane joints securely fastened so that an 0.005-inch feeler gage cannot be inserted? \_\_\_\_\_

Are all threaded covers secured? \_\_\_\_\_

How? \_\_\_\_\_

Are all electrical connections secure \_\_\_\_\_ and properly insulated where necessary? \_\_\_\_\_

NOTE: Add appropriate material for each explosion-proof enclosure when more than a motor and starter are on a machine.

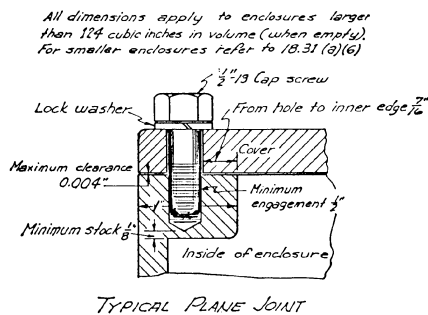


Figure 5

All dimensions apply to enclosures larger than 124 cubic inches in volume (when empty). For smaller enclosures refer to 18.31 (a)(6)

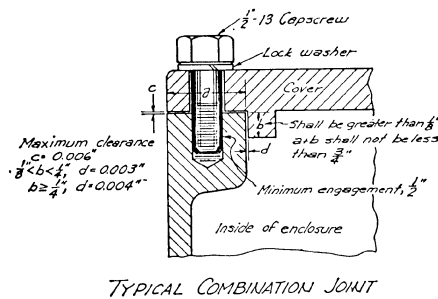


Figure 6

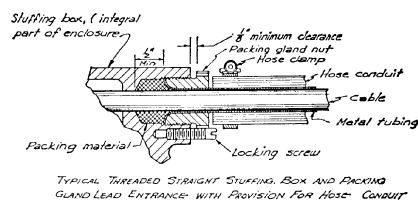
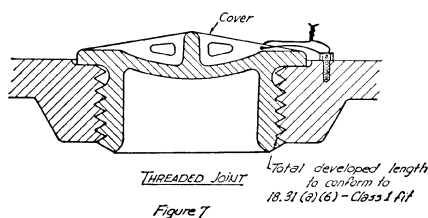


Figure 8

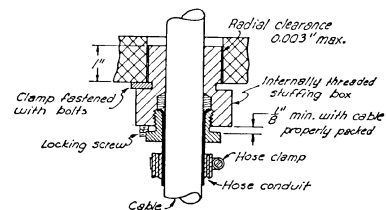
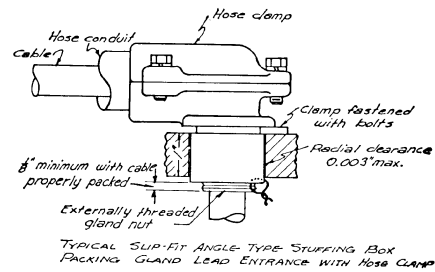


Figure 9

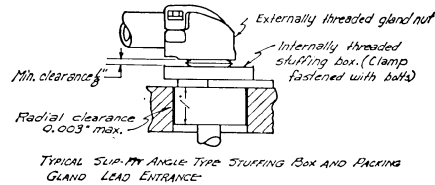
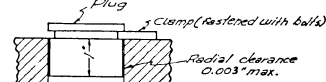


Figure 10

Plugs shall be secured by spot welding or brazing, weld may be on plug, clamp, or fastening bolt



[33 FR 4660, Mar. 19, 1968, as amended at 42 FR 8373, Feb. 10, 1977; 42 FR 25855, May 20, 1977]

## Subpart E—Field Approval of Electrically Operated Mining Equipment

SOURCE: 36 FR 7007, Apr. 13, 1971, unless otherwise noted.

### § 18.90 Purpose.

The regulations of this subpart E set forth the procedures and requirements